REMARKS

The Office Action dated September 24, 2003 presents the examination of claims 1-5, 10-12, 16, and 22. Claims 6-9, 14-15, 17-21, and 23 are withdrawn from consideration. Claims 1-12, 14-15, 17-21, and 23 are canceled. Claims 13, 16, and 22 are amended. Claims 24-26 are added. No new matter is inserted into the application.

Restriction Requirement

The Examiner maintains the restriction requirement such that claims 6-9, 14-15, 17-21, and 23 are withdrawn from consideration. Withdrawn claims 6-9, 14-15, 17-21, and 23 are canceled herein.

Specification

The Examiner objects to the specification. Applicants respectfully traverse. Reconsideration and withdrawal of the instant objection are respectfully requested.

The paragraph on page 15, lines 17-19 of the specification is amended to recite that an amino acid sequence of a murine PBSF/SDF-1 is "encoded by" (rather than "encoding") a murine PBSF/SDF-1 cDNA. This amendment does not incorporate any new matter into the specification since it is well known in the art that an amino acid sequence is encoded by a nucleotide sequence.

The specification is also amended to delete the phrase "of Sequence Listing" following each sequence identifier since the phrase is not necessary.

Applicants respectfully submit that the above amendments fully address and overcome the objection to the specification. Withdrawal thereof is respectfully requested.

Claim Objections

The Examiner objects to claims 1-4 and 13. Claims 1-4 are canceled, thus rendering objection thereto moot. Applicants respectfully traverse the objection applied to claim 13. Reconsideration of the claim and withdrawal of the instant objection are respectfully requested.

Specifically, the Examiner objects to claim 13 for being improperly multiple dependent. Claim 13 is amended into independent form. Claim 13 is also amended to clarify the conditions as those in which the transformant is capable of expressing the expression vector, as suggested by the Examiner.

These amendments to claim 13 are non-narrowing claim amendments meant to clarify the claim language. Withdrawal of the instant objection is therefore respectfully requested.

Rejections under 35 U.S.C. § 112, second paragraph

The Examiner rejects claims 1-5, 10-12, 16, and 22 under 35 U.S.C. § 112, second paragraph for allegedly being indefinite. Claims 1-5 and 10-12 are canceled, thus rendering rejection thereof moot. Applicants respectfully traverse the rejection applied to the pending claims. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

The Examiner rejects the claims for the recitation of "an entire sequence of the amino acid sequence as shown by SEQ ID NO: 2..." and "an entire sequence of the nucleotide sequence as shown by SEQ ID NO: 1...." Claims 16 and 22 are amended into independent form and do not recite either phrase. Thus the instant rejection is overcome.

The Examiner also rejects claim 5 for the recitation of "stringent" conditions. As noted above, claim 5 is canceled. However, claims 13, 16, and 22, as amended, recite the stringent conditions of 42°C, 5 x SSPE, 50% formamide, 1 x Denhardt's reagent, 10% dextran disodium sulfate, and 0.1% SDS. Support for this amendment is found in the specification, such as on page 46, lines 14-16.

Applicants respectfully submit that the pending claims particularly point out and distinctly claim the subject matter which is the present invention. Withdrawal of the instant rejection is therefore respectfully requested.

Rejection under 35 U.S.C. § 112, first paragraph

Written Description

The Examiner rejects claims 1-5, 10-12, 16, and 22 under 35 U.S.C. § 112, first paragraph, for allegedly containing subject matter not described in the specification. Claims 1-5 and 10-12 are canceled, thus rendering rejection thereof moot. Applicants respectfully traverse the rejection applied to the pending claims. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

First, the Examiner asserts that the specification describes SEQ ID NO: 1, but does not provide any examples of fragments or derivatives (i.e., sequences in which there is a substitution, deletion, insertion, or addition). Applicants respectfully disagree. SEQ ID NOs: 3, 5, and 7 are all examples of fragments of SEQ ID NO: 1.

Second, the Examiner asserts that the region of SEQ ID NO: 1 responsible to binding to murine PBSF/SDF-1 has not been identified. Again, Applicants respectfully disagree. It is known in the art that the human CXCR-4 has four extracellular domains considered significant in the binding of ligand (see, specification, page 7, lines 2-6), and further, the present invention shows that murine CXCR-4 supports membrane fusion via the env protein derived from HIV (see, specification, page 17,

lines 8-10). As shown in Examples 5 and 6 of the specification, the DNA of SEQ ID NO: 5 possesses the binding properties of murine PBSF/SDF-1. Taking this information into account, the skilled artisan would be able to deduce which amino acids of SEQ ID NO: 2 or which nucleotides of SEQ ID NO: 1 could be modified without destroying receptor activity.

Enablement

The Examiner rejects claims 1-5, 10-12, 16, and 22 under 35 U.S.C. § 112, first paragraph, for allegedly containing subject matter not enabled by the specification. Claims 1-5 and 10-12 are canceled, thus rendering rejection thereof moot. Applicants respectfully traverse the rejection applied to the pending claims. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

The Examiner asserts that the skilled artisan could not make and use fragments and derivatives of SEQ ID NO: 1 because appropriate guidance is not provided in the specification. Again, Applicants respectfully disagree. SEQ ID NO: 3 is a sequence from the 357^{th} nucleotide to 1046^{th} nucleotide of SEQ ID NO: 1; SEQ ID NO: 5 is a sequence from the 1^{st} nucleotide to 685^{th} nucleotide of SEQ ID NO: 1; and SEQ ID NO: 7 is a sequence from the 141^{st} nucleotide to 1834^{th} nucleotide of SEQ ID NO: 1. All of these sequences serve as examples of nucleotide sequences which retain

the function of encoding a protein which binds murine PBSF/SDF-1.

Claim 22

The Examiner also individually rejects claim 22 for lack of enablement. Specifically, the rejection has two grounds: (1) the Examiner asserts that Applicants have not shown that the claimed kit can determine the onset of AIDS; and (2) the Examiner asserts that Applicants have not shown that the kit will work with less than the full murine CXCR-4 sequence (i.e., fragments or variants of CXCR-4).

With regard to the first ground of rejection, claim 22 is amended to a kit for detecting T-cell-line tropic HIV-1 infection. As noted by the Examiner, the specification is enabling for a kit which can detect infection by HIV. With regard to the second ground of rejection, the Examiner asserts that Applicant has not shown that any derivative or fragment of SEQ ID NO: 1 could be used to detect HIV-1 infection. Again, Applicants respectfully disagree. SEQ ID NO: 3 is a sequence from the 357th nucleotide to 1046th nucleotide of SEQ ID NO: 1; SEQ ID NO: 5 is a sequence from the 1st nucleotide to 685th nucleotide of SEQ ID NO: 1; and SEQ ID NO: 7 is a sequence from the 141st nucleotide to 1834th nucleotide of SEQ ID NO: 1. All of these sequences serve as examples of nucleotide sequences which retain the function of encoding a protein which binds murine PBSF/SDF-1.

On page 11 of the Office Action, the Examiner rejects claim 22 again for lack of enablement. The Examiner appears to state that only recombinant cells that express heterologous hCD4 and mCXCR-4 receptors are capable of binding to HIV, and therefore are enabled by the specification. Claim 22 is amended to recite recombinant cells that express heterologous hCD4 and mCXCR-4. Thus, the instant rejection is overcome.

Rejection under 35 U.S.C. § 102(a)

Nagasawa et al.

The Examiner rejects claims 1, 3, 10-12, and 16 under 35 U.S.C. § 102(a) for allegedly being anticipated by Nagasawa et al. (PNAS 93:14725-29, 1996). Claims 1, 3, and 10-12 are canceled, thus rendering rejection thereof moot. Applicants respectfully traverse the rejection applied to the pending claims. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

The present invention is based on the surprising findings of the present inventors that mouse CXCR-4 can be used as a co-receptor for HIV infection. Nagasawa et al. teaches away from the present invention because Nagasawa et al. denies that HIV can infect a non-human cell (see, abstract, lines 24-29, and page 14729, left column, lines 6-8).

For this reason, Nagasawa et al. fails to anticipate the

present invention. Withdrawal of the instant rejection is therefore respectfully requested.

Heesen et al. or Ashorn et al.

The Examiner rejects claims 16 and 22 under 35 U.S.C. § 102(a) for allegedly being anticipated by either Heesen et al. (*J. Immunol.* 157:5455-5460, 1996) or Ashorn et al. (*J. Virol.* 64(5): 2149-2156, 1990). Applicants respectfully traverse. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

Heesen et al. discloses the cloning of a murine homologue of CXCR-4. Ashorn et al. discloses cells expressing CD4/gp160 for the study of membrane fusion. Both Heesen et al. and Ashorn et al. teach away from the present invention by denying that HIV can infect a non-human cell (see, Hessen, page 5458, right column, lines 2-3, and Ashorn, abstract). The present invention is based on the surprising findings of the present inventors that mouse CXCR-4 can be used as a co-receptor for HIV infection.

For this reason, Heesen et al. and Ashorn et al. fail to anticipate the present invention. Withdrawal of the instant rejection is therefore respectfully requested.

Rejection under 35 U.S.C. § 103

The Examiner rejects claims 1, 3, 10, 11, and 12 under 35

U.S.C. § 103(a) for allegedly being obvious over Heesen et al. Claims 1, 3, and 10-12 are canceled, thus rendering the rejection moot.

Conclusion

Applicants respectfully submit that the above remarks and/or amendments fully address and overcome the outstanding rejections and objections. For the foregoing reasons, Applicants respectfully request the Examiner to withdraw all of the outstanding rejections and objections, and to issue a Notice of Allowance indicating the patentability of the present claims. Early and favorable action of the merits of the present application is thereby respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Kristi L. Rupert, Ph.D. (Reg. No. 45,702) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of three (3) months to March 24, 2004, in which to file a reply to the Office Action. The required fee of $950.00 is enclosed herewith.

If necessary, the Commissioner is hereby authorized in this,

concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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